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Migrants and Mobile Technology Use: Gaps in the Support Provided by Current Tools

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Our current understanding of how migrants use mobile tools to support their communication and language learning is inadequate. This study, therefore, explores the learner-initiated use of technologies to support their comprehension, production, and acquisition of English following migration to Canada. Information about migrant use of technologies and experiences was collected by interviews. The interview data was analysed through the complementary lenses of noticing, from language learning, and appropriation, from human-computer interaction. Combining these lenses enabled the identification of unmet migrant communication, support, and learning needs. The manner in which migrants employed mobile and other tools to facilitate their learning and communication were identified through the application of these theories. This analysis indicates that migrants can use existing tools to access information. However, they need additional support if they are to take full advantage of existing mobile tools. Moreover, there is a need for tools that support larger gaps in their knowledge and skills. Migrant experiences indicate that they need additional social, meta-cognitive, and emotional support. These needs suggest opportunities for creating mobile tools that scaffold the development of new skills that include the learner's ability to monitor and plan his or her learning and understand language produced by those who speak different varieties of English or who have non-majority accents.

Keywords: Mobile Assisted Language Learning; Computer Assisted Language Learning; English Language Learners; Assistive and Augmentative Communication

Of those who migrate to Canada, approximately 62 percent are from non-English speaking countries (MPI Data Hub 2016), suggesting these migrants need additional support. This need is confirmed by the existence of government and other language-training programs (Citizenship and Immigration Canada 2013). However, English language learner (ELL) experiences following migration indicate that these programs do not always meet their everyday needs (Demmans Epp 2016a). These migrants have been turning to mobile and other technologies to support their unmet needs, which include communication (Palalas 2011; 2015; Demmans Epp 2016b). Unfortunately, our understanding of migrants' use of mobile and other technologies is limited because the study of mobile language learning tools has predominantly focused on foreign language learners at the post-secondary level (Kukulska-Hulme 2013; Traxler 2013; Burston 2014) rather than those who must use the language to survive. This study explores the technology use of recent migrants to Canada from the perspective of how they regulate and scaffold their language learning and communication rather than from the majority perspective where instructors guide or assign mobile-assisted

language learning (MALL) activities. Because technology use is migrant-initiated, a wide range of tools fall under the MALL banner. Any technology that migrants use to support their language learning or communication while they are mobile or that is available through a mobile device is considered a MALL tool. This broad definition includes services like Google Translate or YouTube, dictionaries, and dedicated language-learning applications (e.g., DuoLingo).

Migrants' current use of MALL tools

Prior work exploring migrant use of MALL tools, in the Canadian context, has employed participatory design-based research methods. Palalas (2010; 2011) focused on using MALL to support ELLs within a particular academic program. This program aimed to support the domain-specific language development of professionals rather than the everyday needs of ELL migrants. In other geographic contexts, MALL tool use by migrants has taken different foci. Some projects have focused on the development of linguistic and cultural knowledge, in the form of slang and colloquialisms, across learning environments (Procter-Legg *et al.* 2012), while others have focused on supporting migrants' language learning, navigation, and access to information (Kukulska-Hulme *et al.* 2015) or their language learning and knowledge of various government

services (Pearson 2011a; 2011b). Scholars have argued that particular areas of mobile learning need further investigation. The identified gaps include the study of informal learning contexts (Kukulska-Hulme and Shield 2008; Demouy *et al.* 2016), learner initiated use of MALL tools (Demouy *et al.* 2016), tools for supporting authentic synchronous communication (Kukulska-Hulme and Shield 2008; Palalas 2010; Demmans Epp 2016a), methods for effectively incorporating mobile technologies into different learning contexts (Pilar *et al.* 2013), and the need to understand how user culture and environment influence their use of mobile tools (Viberg and Grönlund 2013).

This limited understanding of how migrants initiate mobile tool use to support their learning of the dominant language and their interactions with that language led to the study of how migrants use existing mobile tools to support their communication and language learning. Because this study takes the perspective of how migrant learners initiate mobile tool usage to support their goals, it is appropriate to consider ELL tool usage through the lens of noticing. This cognitive process enables people to learn through their attention to language within their environment (Robinson *et al.* 2012) and the use of self-monitoring activities that allow learners to identify gaps in their knowledge or skills. Consistent with these types of activities, it has been argued that MALL tools support noticing by allowing learners to record novel language that they encounter in their environment so they can later use the logged information to develop their knowledge (Kukulska-Hulme and Bull 2009).

Beyond logging, mobile tools have been shown to support the language production of those who cannot speak because of medical conditions (Demmans Epp *et al.* 2011). These results indicate mobile tools have the potential to enable migrant communication when gaps are noticed as a result of interacting with others. It has been posited that “producing language serves second language learning in several ways” (Swain 1995, p. 125): it provides practice, supports noticing, enables hypothesis testing, and enables the internalization and control of linguistic knowledge.

A variety of tools that include mobile translation services and dictionaries can be used to fill gaps that migrants have noticed (Demmans Epp 2016b). These gaps include lacking vocabulary knowledge (Demmans Epp 2015), lacking pronunciation knowledge (Demmans Epp 2016b; 2016c), and the inability to communicate (Demmans Epp 2016a). Some specific tools further aim to provide targeted support for text comprehension or other language skills. Among them is a tool that allows learners to substitute synonyms within texts that they are having difficulty understanding (Veras *et al.* 2014) or practice the pronunciation of words (Munteanu *et al.* 2013) and fill any gaps they have noticed.

To build on this prior work, a three-week deployment of a mobile tool was followed by semi-structured interviews with 18 recent migrants who had varied English language abilities. This study asked: (1) how, if at all, migrants support their communication and language-learning needs by employing the many mobile tools they can access, and (2) which of their language-learning and communication

needs are not being met by current MALL tools. The results highlight how ELL migrants can use the many tools that support narrow learning tasks (e.g., vocabulary knowledge or grammar). The data also indicate there are too few tools that scaffold the larger learning challenges faced by these migrants. These challenges include ELLs’ ability to communicate, understand multiple registers, or obtain socio-emotional support.

Methods

To better understand how recent migrants use technology to support their language-learning and communication needs while improving upon the design of an experimental application, a deployment study was conducted from a user-centred design perspective. This method allowed the collection of rich ecologically valid information that addressed both of these goals.

Theoretical framing

This research combines a human-computer interaction lens with that of noticing since both involve the identification of gaps from different perspectives. The first focuses on identifying the manner in which technologies promote or hinder the user’s ability to achieve his or her goals (Norman 2002; Dix *et al.* 2004). The second describes the process by which language learners identify gaps in their knowledge so that they can fill those gaps (Swain 1985; 1995). This combination brings both a techno-behavioural and learning perspective to the analysis of how recent migrants approach language use and learning; it enables the study of how migrants employ technology to support their language-learning and communication needs.

Noticing describes the process by which learners attend to language and are aware of language (Schmidt 1990; Robinson 1995). This attention and awareness allows learners to store language in memory, supports their later processing of language, and enables the identification of new, novel, or different linguistic features. All of these activities work together to facilitate learning (Schmidt 2001). Another theory that is argued to support noticing is that of languaging (Swain 1985; 1995; 2006) because the effortful use of language leads to a greater depth of processing, draws the learner’s attention to the form and meaning of language, and allows for hypothesis testing. These benefits of languaging and more specifically of language production are argued to help learners notice the “gap between what they *want* to say and what they *can* say” (Swain 1995, p. 126). This form of noticing can lead to learning, provided ELLs respond appropriately.

Studying mobile technology use from the perspective of noticing allows us to infer migrant needs based on the theory of appropriation (Dourish 2003), which states that users adapt the technology so that it can function within their existing practices. This adoption process also results in users adapting their praxis to use a given technology more fully. This repurposing of technologies to support user needs reveals gaps in user abilities in a similar manner to that of noticing in language learning. This adoption process can also be used to identify shortcomings or gaps in the available technology. As a result, these theories are

employed to explore how learners use mobile and other technologies to support their learning and communication when they have noticed a gap in their knowledge or skills.

Mobile applications

Participants were given a mobile device (iOS 4 or android Jelly Bean 4.2+ smartphone) with the experimental application installed. Devices were provided because the applications were experimental, which meant that participants may not have had the device type and configuration that was needed to support the study's secondary goal of developing a communication support tool for ELLs. This goal is not a focus of the current paper.

The provided applications are not described in detail since system descriptions have already been published, i.e., (Demmans Epp *et al.* 2013; 2015). An overview is instead provided to support comprehension.

These applications were in many ways similar to visual dictionaries. **Figure 1** (left) shows an abstraction of the information that each application presented to participants. In addition to showing image-word pairs, both applications allowed text to be verbalized through the text-to-speech feature of the mobile device. **Figure 1** also shows samples of content from the first tool (centre) and the second tool (right). The first tool provided no additional support and organized content into hierarchies. Tool 2 provided samples of vocabulary use in addition to allowing learners to access definitions. Tool 2 organized vocabulary using a graph that described the categories to which support materials belonged, and the materials were searchable.

Data collection instruments

A demographics form was used to collect information about participants' language background and exposure.

Semi-structured interviews were used to collect information about migrant experiences. The interviews discussed participants' language-learning and communication

experiences, their general use of technology, and their specific use of technology to support their language learning or communication.

Procedures

After obtaining participant consent, the demographics form was completed, a mobile device with an accompanying experimental MALL application was provided, and the application features were demonstrated. Participants were free to use the application and mobile device in whatever manner suited their needs. Participants were also welcome to modify the devices that they were given and continued to use their own devices.

Participants returned the devices after three to four weeks and participated in an interview. The interviews lasted approximately an hour. They were recorded and transcribed for later analysis.

Additional tools and strategies were employed to mitigate the challenges of communicating across cultures or when the interviewer and participant lacked fluency in the same languages. These strategies and tools included dictionaries, translators, gestures, cognates, and a shared writing space. An example of this shared writing space can be seen in **Figure 2**. It shows a participant's use of Spanish-French cognates to support his communication with me. It also shows a drawing of two possible interpretations of some of the feedback he was providing. The one that he intended is circled.

Analysis

A team of three coders, including those who conducted the interviews, sat around a table together and coded the transcripts. Both inductive and deductive coding were performed and thematic analysis was conducted (Patton 2002). Coders worked together until consensus was achieved. Deductive coding focused on identifying the specific types of technologies that learners had used, the gaps that they had noticed, and how they had filled or bridged those gaps.

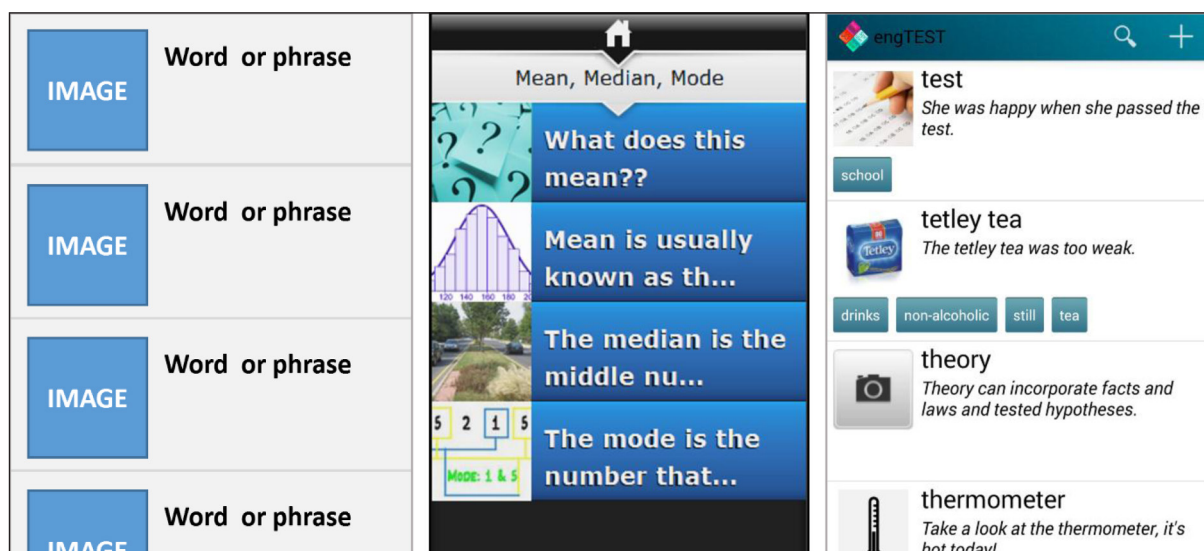


Figure 1: An abstraction of the common materials (left), a sample of the simple support materials within tool 1 (centre), and those within tool 2 (right).

To understand how these codes varied across participants, each code that was associated with a gap was placed along a spectrum between weak and strong based on the level of support found for that code within each participants' interview transcripts. This spectrum represents an interpretation of how much participants emphasized aspects of their experiences. As a result, the placement of a code along a participant's emphasis spectrum balanced quantitative and qualitative aspects of participant experiences. So, codes that appeared extensively throughout a participant's interview (e.g., a lack

of vocabulary knowledge) or those where the participant explicitly emphasized an experience through their emotional responses and vocabulary (e.g., being able to communicate in an emergency) are nearer the strong end of the spectrum. Codes that only appeared a few times or where the participant did not emphasize the experience as central are nearer the weak end of the spectrum.

Participants

Participants were recruited through advertisements in public spaces, online forums, Meetups for English language learners, and government programs for recent immigrants. **Table 1** shows participant pseudonyms as well as the variability in their ages (in years), home languages (L1), and proficiency with English. For those who migrated to pursue educational opportunities, their proficiency was recorded as the minimum International English Language Testing System (IELTS) score needed to enrol in their academic program. The proficiency level of those who had migrated to flee political instability or pursue economic opportunities was determined based on the Canadian Language Benchmark (CLB) level of the courses in which they were enrolled. Like other migrants, those who were employed were under-employed because their prior training was not recognized (Guo 2009) or their English proficiency and cultural knowledge prevented them from gaining access to employment. Only six of those who had migrated for educational purposes were granted direct admission to their programs. The others were required to take a preparatory English course before they could enrol in regular courses.

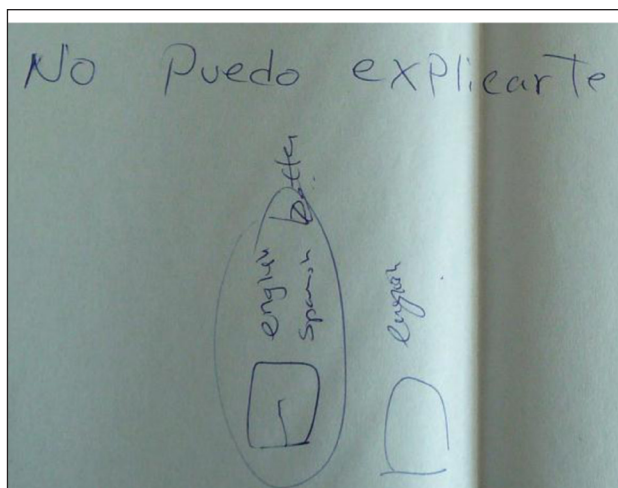


Figure 2: A portion of the shared writing space from my interview with Luis.

ELL	Tool	Age	Sex	L1	English Proficiency	Migration Rationale	Work
Jian	1	49	M	Chinese (C.)	CLB 1	Economic	None
Arash	1	42	M	Farsi	CLB 4	Economic	Dishwasher
Ju	1	18	F	Chinese (C.)	IELTS 6.5+	Education	Student
Luis	1	44	M	Spanish	CLB 2	Political	None
Dima	1	65	M	Bulgarian	CLB 3	Political	Construction
Adora	1	36	F	Spanish	CLB 2	Political	None
Ling	1	46	F	Chinese (M.)	CLB 4	Economic	None
Mei	1	55	F	Chinese (M.)	CLB 4	Economic	Cook
Fan	1	48	M	Chinese (M.)	IELTS 6.5+	Education	None
Shu	1	21	F	Chinese (M.)	IELTS 6.5+	Education	Student
Alda	2	22	F	Portuguese	IELTS 6.0+	Education	Student
Ya	2	27	F	Chinese (M.)	IELTS 6.5+	Education	Researcher
Pio	2	23	M	Portuguese	IELTS 6.0+	Education	Student
Zhen	2	24	F	Chinese (M.)	IELTS 6.5+	Education	Researcher
Gil	2	21	M	Portuguese	IELTS 6.0+	Education	Student
Miao	2	24	F	Chinese (M.)	IELTS 6.5+	Education	Researcher
Ana	2	21	F	Portuguese	IELTS 6.0+	Education	Student
Davi	2	23	M	Portuguese	IELTS 6.0+	Education	Student

Table 1: Participant demographics and language abilities (M. Mandarin, C. Cantonese).

Participants received 10 dollars as compensation for the time that they spent on study-related activities.

Results

Participant experiences demonstrated that a number of MALL tools support the gaps that they had noticed in their vocabulary knowledge. The interview data also showed that these migrants were able to repurpose mobile tools to support their modelling and rehearsal activities and on occasion, their communication. However, these higher-level goals could be better supported as could the processes, such as noticing and self-regulation, that enable learning. The data underlying these findings will be discussed by first detailing participant use of technology before discussing each of the themes that emerged from the interviews. These themes describe how participants used different classes of media and MALL tools to support their language learning or fill gaps in their knowledge; migrants' limited communication abilities; and how they used mobile tools to support their communication.

Technology use

Participants were comfortable using the provided mobile devices and application. They installed other applications and used additional resources through the provided smartphone. They were also comfortable using a variety of everyday technologies and dedicated language-learning tools to support their comprehension and knowledge acquisition. These technologies took a variety of form factors with all participants using print media and mobile devices. Other common form factors included the

television and computer: Jian was the only participant who did not have a television and Dima was the only participant who avoided computer use.

Table 2 indicates which learners had used different classes of media and technology to support their learning or communication. While only nine had used MALL tools prior to the study, all of them had used at least one MALL tool by the end of the study. In some cases, they had even adopted the experimental tool or integrated it as one of the steps in their communication and learning processes. Shu described how she would use the materials from the provided application to prepare for a situation and “then, if you go there, you can ask someone for help”.

Similar to the results from a survey of foreign language learners (Demouy *et al.* 2016), participating migrants predominantly relied on language-learning technologies that encouraged studying but not interaction. This is evidenced through their reports of extensive dictionary use, language-learning tape use, use of translation tools (e.g., L1-English dictionaries or Google translate), use of visual supports (e.g., Google image searches or captions), and their non-use of communication support tools. It was reported and observed that mobile translators were used to translate specific words from participants' L1 to English.

This reliance on tools that support receptive knowledge development was in spite of a general belief that using the target language to interact with others would support their language learning. As Ju stated, “just speaking, being in a different country” was the most beneficial.

ELL	Media				Tools				
	Video	Audio	Text	Images	Dictionaries	Translators	Google	Captions	MALL
Jian		✓	✓	✓	✓	✓			✓
Arash	✓	✓	✓	✓	✓	✓	✓		✓
Ju	✓	✓	✓		✓	✓	✓		✓
Luis	✓	✓	✓	✓		✓	✓	✓	✓
Dima	✓		✓		✓	✓	✓		✓
Adora	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mei			✓			✓	✓		✓
Fan	✓	✓	✓		✓	✓			✓
Shu	✓	✓	✓		✓				✓
Alda	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ya	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pio	✓	✓	✓		✓		✓	✓	✓
Zhen	✓	✓	✓	✓	✓	✓	✓	✓	✓
Gil		✓	✓	✓	✓	✓	✓		✓
Miao		✓	✓	✓	✓	✓	✓		✓
Ana	✓	✓	✓						✓
Davi	✓	✓	✓	✓	✓	✓	✓		✓

Table 2: Technology use by participants to support their language learning and communication.

Language learning and technology

Participants had taken English language courses. With the exception of Ju, Fan, and Shu who had participated in English-language degree programs, participating migrants were taking English-language courses during the study. Their informal learning activities relied on strategies (e.g., watching videos) that would develop their receptive language abilities (see **Table 2**). Ju would eavesdrop on others in her environment to practice her ability to understand aural English. Others tended to gain access to authentic audio materials by watching movies or television and listening to the radio or music. To improve their reading, participants sought materials that were at an appropriate linguistic level. This meant reading children's books, Internet articles, and community-focused newspapers. They supported this activity using dictionaries and indicated their frustration with the difficulty of learning English through statements, such as "It's all hard" (Luis), "there's so much to learn" (Ana), or "it's just too hard to comprehend it all" (Miao).

Technology-enabled rehearsal

Participants had appropriated an array of general-purpose technologies (see **Table 2**) to support their language-learning activities. These activities included listening, reading, and writing. For example, participants would use L1 subtitles to verify their comprehension of video dialogue or they would use English subtitles to support their decoding of dialogue. However, none of these technologies met learners' desire for additional planning and rehearsal opportunities. The opportunities were wanted because "practice is always the best for everything" (Ju). Parroting audio materials, whether they originated from a video, song, language-learning tape, or the text-to-speech engine of a smartphone were all perceived as beneficial. Shu also showed appreciation for the review of scripts "to model conversations" because it helped her to acquire pragmatic knowledge that she could later use.

Location-based study

MALL tools were primarily used in private locations, even though participants liked how "you can use it wherever you are" (Adora). Public-space usage by Adora, Zhen,

Davi, Luis, Ya, Mei, and Arash centred on studying vocabulary while commuting. This use illustrates how they had embedded MALL tools into their daily routines in a similar way to foreign language learners (Demouy *et al.* 2016). This public-space usage also included an instance of group content exploration when Arash showed the provided application to a friend.

Provided tool use

Participants used the prototype MALL applications to learn vocabulary or to practice and test their listening skills by employing the text-to-speech feature to enable dictation tasks at the word, sentence, or paragraph level (**Figure 3**). As Jian stated, while demonstrating his usage, "I only look here. I listen. Listen. Here, I writing". Participants also used the content provided by the experimental applications to complete homework, model appropriate word usage, and verify word spellings.

Learner-identified knowledge gaps and resultant technology use

Figure 4 shows the low-level knowledge gaps identified within each participant's interview transcripts. Participants are shown across the bottom of the image (each column is a participant) and gaps are shown from top to bottom (each row is a gap). The amount of blue in any square indicates how strongly a participant emphasized a particular gap. For example, Jian and Alda were the only participants who emphasized the challenges they faced when trying to spell words correctly. As can be seen from Ya and Ju's light blue squares, they mentioned spelling briefly but did not emphasize it as a major gap or speak about it extensively. The amount of white and pale blue present in the pronunciation and grammar rows of **Figure 4** shows participants were not deeply concerned about ensuring their grammar was correct or their pronunciation perfect. Rather, their primary concern is indicated through the dark blue that can be seen across all learners in the vocabulary row of **Figure 4**: the majority of the gaps participants noticed were the result of words that they did not know, with lower proficiency learners struggling to determine the meaning of a vocabulary item

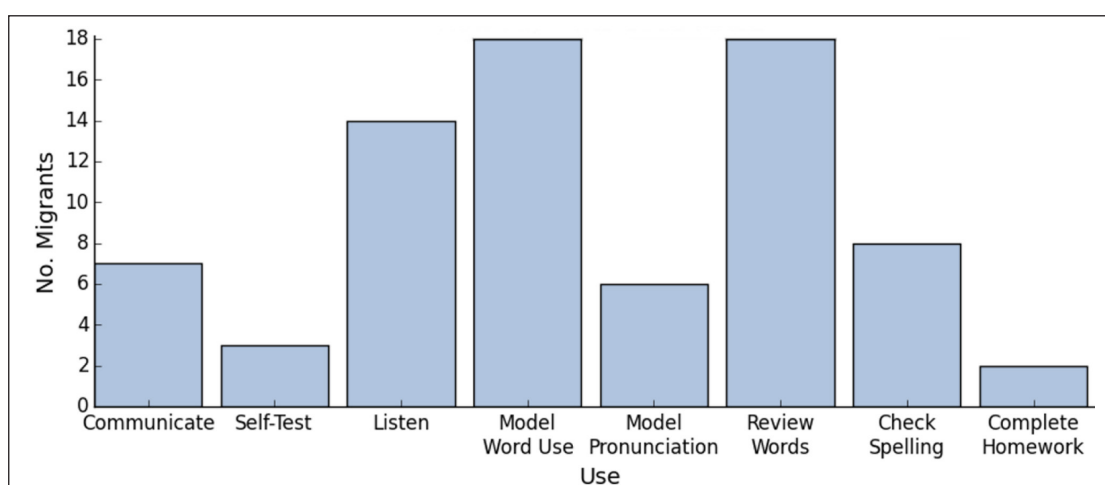


Figure 3: Participant use of the provided MALL tools to support their goals.

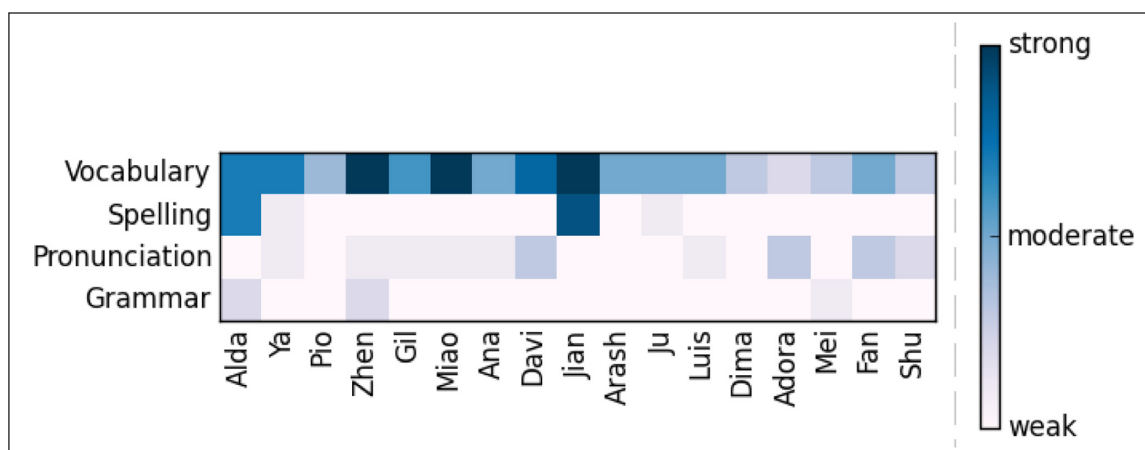


Figure 4: The breadth and depth of gaps that participants had noticed in their knowledge of English.

through the word's context of use. In contrast, higher proficiency learners (Ju, Pio, Zhen, Miao, Ana, and Davi) identified many vocabulary gaps but reported being able to use context to determine a word's meaning.

Participants emphasized gaps in their vocabulary knowledge because these gaps were seen to gatekeep participant access to information as well as their communication with others: “the words [were] too professional” (Shu) and “sometimes I just forget the word the person is speaking and I don’t get the meaning of the word” (Davi). This tendency to focus on gaps that they had noticed in their vocabulary knowledge (Figure 4) is demonstrated through participant media preferences (Table 2) and study habits where, as Mei stated, “Very good picture. Study there”. More advanced learners (e.g., Zhen) instead used images to gist word meaning or find the desired word within the provided application so that the text-to-speech feature could be used to provide a pronunciation model for that vocabulary item. In contrast, Davi used the text-to-speech and recording features (Table 2 – audio) to monitor his abilities because it allowed him to “hear the pronunciation, hear [his] voice and compare”. Like Jian, others self-tested by writing “down the thing after you listen” (Ya).

Tool constraints: resource quality and context

Given participants' focus on gaps in their vocabulary knowledge, we will take a closer look at how they used technology to fill those gaps (Figure 5). The use of mobile dictionaries, thesauri, and translators was common (Table 2 and Figure 5) even if these tools were not heavily emphasized. Mobile and paper versions of these tools were combined depending on the learner's current physical and social context, with paper-based resources tending to be used in formal learning environments and mobile-based resources being used across contexts. In addition to these traditional support tools, migrants used Google image searches to gist vocabulary meanings and Wikipedia articles to understand vocabulary that is more advanced. However, there were concerns about how well these resources supported the ability of ELLs to understand verbs because they are “harder to understand. And maybe I think the more useful vocabulary is the verb”

(Zhen). When commenting on the inadequacies of current tools, Alda mentioned cases where she had noticed gaps in her grammatical knowledge: “sometimes I need to know what is noun, what is verb, what is adverb”.

Individual differences in MALL tool usage

There appear to be differences in how migrants used technology based on their background. Those who had migrated for educational reasons tended to rely more on mobile technologies, whereas the older participants who had migrated for political or economic reasons had yet to integrate mobile tool use to support language learning during their everyday activities. This is shown through the darker blue boxes that are associated with the learners on the left of the Dedicated MALL row in Figure 5.

Learner self-regulation and meta-cognition

Participants' focus on vocabulary knowledge almost to the exclusion of other knowledge components may be indicative of several participants' generally low proficiency levels, the challenges that they face every day, or a need for better self-regulation and meta-cognitive skills. This appears to be the case when considering how those with higher English proficiency placed more emphasis on a greater variety of gaps and a wider use of tools to fill those gaps. This is shown through the appearance of more blue squares in those participants' columns within Figure 4 and Figure 5. Migrants' ability to explicitly notice gaps also seemed to coincide with their reporting meta-cognitive skills such as reflection and planning. Arash, Adora, Ju, Pio, and Miao reported experiences that were indicative of meta-cognitive activities. For Adora these included reflection (“I like when I dream in English because I understand my brain is doing something a step important”) and self-regulation strategies, such as monitoring: “record your voice to see if your pronunciation is right”. Ju highlighted the integration of her noticing with the self-regulated learning strategy of logging: “when I learn new vocabulary I just write it down in my notebook and create a glossary for myself”. Participants wanted to share these types of resources and were willing to improve upon existing MALL tool content by making small edits or adding information to existing content. Arash went as far

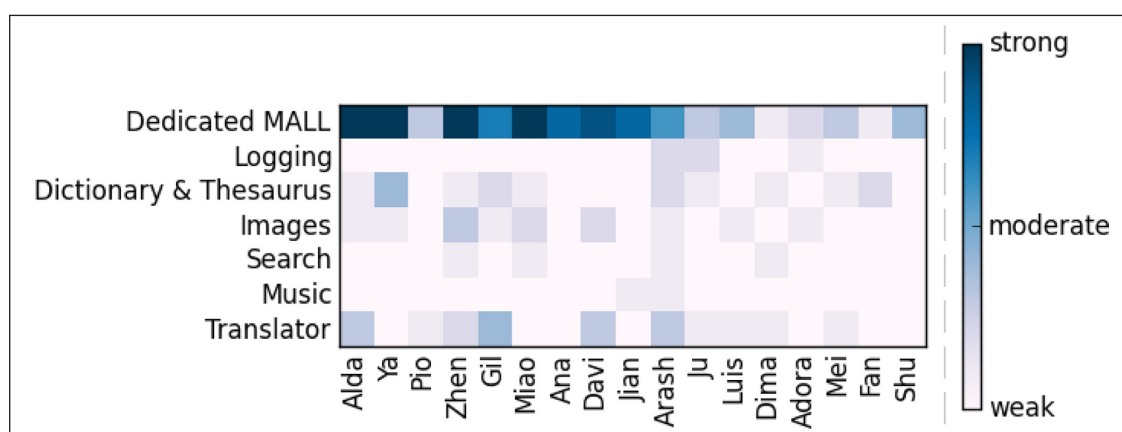


Figure 5: The different tools that migrants used to fill gaps they had noticed in their vocabulary knowledge.

as using the provided application to log novel vocabulary by creating new support materials that he then offered to share with other learners.

While all participants reported experiences that evidenced the noticing and filling of gaps, only a few (Fan, Adora, Pio, Miao) were aware of the gaps that they were noticing and explicitly trying to fill them using social or technical supports. The approaches used by these learners were consistent with those of the other participants. These migrants were only distinguished by their levels of self-awareness.

The use of mobile tools and applications to support vocabulary learning, listening practice, learner-initiated testing, and self-monitoring activities demonstrates that learners are able to see the more obvious uses of mobile tools. However, these limited uses indicate that tools could support a greater breadth of activities: ones that are less focused on studying or memorization. Instead, MALL tools could focus on supporting socio-collaborative approaches to learning or enabling learners to develop their self-regulation strategies by providing formative feedback. Moreover, mobile tools could better support migrant emotional needs because these ELLs are “really scared” (Alda) and frustrated.

Communication: learner strategies for overcoming barriers

Participants focused on their ability to communicate a message rather than its form. They wanted to communicate with others using English, which is consistent with this focus. Communication failure and people’s resistance to communicating with participants frustrated them. As Fan stated, “they don’t want to share”.

To combat these challenges and achieve their goal, participants enacted strategies and selected activities that would support the development of their communication skills. For example, Mei typed and brought a letter describing her experiences so that she would be able to communicate effectively during the interview. Ju, Adora, Miao, Ana, and Fan demonstrated a desire for socio-collaborative approaches to learning and self-regulation when they joined conversation clubs to rehearse their oral communication skills. Similarly, Ju indicated an interest in specific types of collaborative activities that match

Storch’s expert/novice interaction pattern (Storch 2002). She said,

Some people are better at the writing part but not so good at the speaking part, which is what happened to one of my friends, and I was better at the speaking part than her. So, I was, like, helping her, like, speak more fluently, and she helped me with the writing part.

Participants commented on how few people were helpful. Stating “only teacher helpful” (Jian) and that “the people [at] immigration. It’s good people. Ya. They understand the problems. My problems”. (Luis). As these quotes indicate, those in key positions were helpful but additional support and understanding are needed in everyday situations. This is even more critical in high stakes settings such as the hospital where “you *have* to speak English” (Arash).

Learner-identified communication gaps and resultant technology use

As illustrated through **Figure 6**, participants focused more on their comprehension gaps even though they may have had deeper concerns about their ability to produce language (the Listening and Reading rows): “I hear, maybe understand, the word. I speak. I don’t know how to speaking” (Mei). To avoid this problem, Alda would “mostly talk over e-mail” because “it’s not frustrating but it’s also not so nice”. This difference in the extent and depth of their concerns may have been reinforced by the challenges that they faced in accessing communication opportunities.

Technology and strategies for overcoming comprehension and production barriers

MALL tools were used to fill gaps in learners’ ability to communicate (Speaking and Writing in **Figure 6**). Like other participants, Pio said that he used the mobile version of Google translate “to translate a lot of words” when writing. In a similar fashion, migrants used the provided applications to access the words that they needed or remind themselves of a word’s pronunciation to enable their writing and speech (**Figure 3**). Using these MALL applications enabled learners (Adora, Pio, Zhen – light to dark blue in **Figure 6**) to overcome communication barriers that

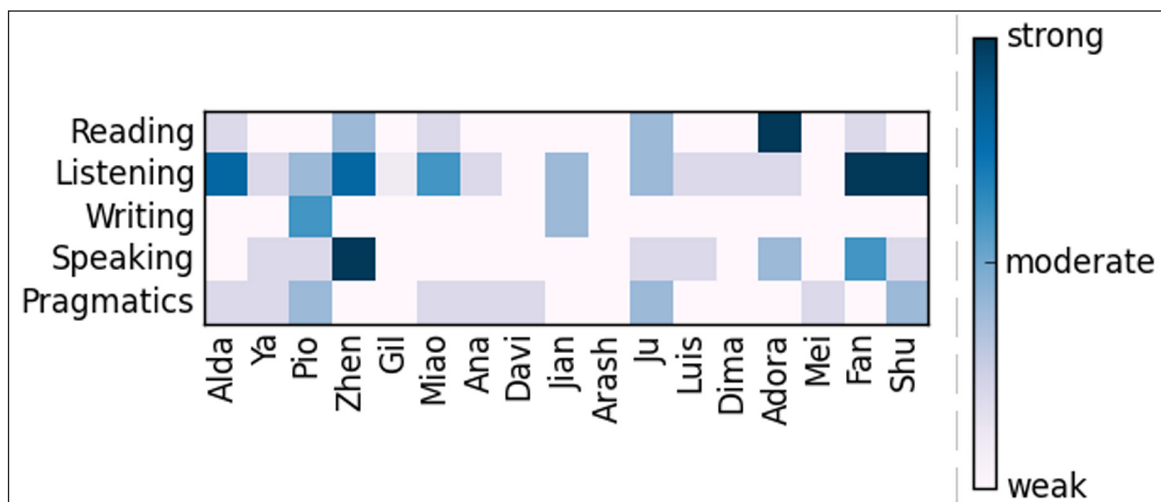


Figure 6: Gaps that participants had noticed in the higher-level knowledge and skills that are associated with communication.

would make them “go to the other kind of stores” (Adora). Using mobile tools also allowed participants to determine how to appropriately use words by looking at “the sentence to apply these words” (Pio). Similarly, Zhen reported using an “English application about conversation” to learn common phrases so that she could later use those phrases to support her communication.

Participants also detailed situations in which they had used different strategies or technologies to support their communication when it was failing. For example, Luis and Adora used Spanish–English cognates to understand or to guess which word they needed to produce in order to be understood. Arash instead provided examples to clarify his intent. When that failed, he would use the mobile Google translate service to support his language production. Similarly, Adora turned to Google translate to support her understanding of a phone service contract when, as she explains it, “something in the contract I don’t understand and the guy helped me. He was like the google translator but that was okay” (light blue in the reading row of **Figure 6**). In contrast to these proactive meaning negotiation strategies that were occasionally suggested by an interlocutor, participants reported sometimes avoiding communication after they had experienced failures. For example, Dima allowed his wife to communicate for him “every time [he was] with his wife” in a public setting.

Participants were concerned with their ability to understand others because, as Shu said, “people speak too fast and then I get lost” and “sometimes I know the words but when someone speaks them I can’t recognize that”. Participants also found it “difficult to understand them because of the accent” (Ana). Pio even identified her listening comprehension as her primary weakness and specified a method for improving her listening that was contextualized in the nature of her gap: “I need to watch more movies in order to improve my weak point which is understanding native people talk. But when I’m watching a lecture, I don’t need to put on subtitles”. In a similar way, Shu used the experimental application to develop her listening skills by selecting a word or phrase. She would then “tap it and it could pronounce that sentence. So,

[she], uhh, learned all of the sentences”. While these types of activities seem to dominate the activities of participants and other language learners (Demouy *et al.* 2016), the described strategies are insufficient for helping recent migrants overcome the barrier of communicating with speakers from different regions. As Pio states, some speakers “talk very clear. It’s easy to understand them but people from China and Japan. It’s very difficult. Sometimes I can’t catch what they say. It’s very hard and I found trouble understanding talks in movies”.

Technology use to support pragmatics

Participants were concerned with pragmatics as can be seen by the broad presence of blue squares in the Pragmatics row of **Figure 6**. They were specifically concerned about the appropriate use of vocabulary and colloquial expressions. As Shu said, these migrants wanted to know “how native speakers would use them”. Ju further explained that she would “watch movies. There’s TV shows. There’s music” to learn about the pragmatics of using different vocabulary and phrases. These quotes indicate that migrants want support with respect to language use in real-world contexts. They need additional support to ensure that they can use their basic language knowledge in a way that is appropriate to their current socio-cultural situation. They also need additional support when trying to negotiate misunderstandings or communicate in high-stakes settings. None of these needs is currently being met by MALL or other tools. At best, current tools allow migrants to gain exposure and sometimes rehearse language use. Both of these activities are necessary but insufficient for ensuring language learning and its later use.

Discussion

The above-described uses of mobile and other tools to support both the language learning and communication of recent migrants detail how they appropriated (Dourish 2003) various commonplace technologies (e.g., Google Translate) by adapting their use of these technologies to support their language-learning and communication needs across a variety of contexts. This

includes the willingness of learners to take risks by seeking situated-learning opportunities that require the effortful use of English. It also includes additional scaffolding activities, such as preparing scripts, that learners performed to equip themselves for interacting with others using English. While the above results are positive, they highlight areas that are in need of additional support. When considered alongside previous research, the gaps that were noticed by these migrants and the gaps that could not be filled suggest the need for new tools and approaches to providing support. Among the areas that need additional support are tools that enable and encourage the self-regulation activities and noticing of learners; tools that help them to overcome language barriers that are the result of people using a variety of forms of English; and tools that allow migrants to rehearse their communication while providing them with feedback that enables their planning of future learning.

Like previous explorations of mobile learning tools (Liu 2009; Palalas 2011; 2015; Pearson 2011b; Munteanu *et al.* 2013; Demouy *et al.* 2016), these learners readily accepted the use of MALL tools and in many cases were already using a variety of mobile or other technological supports to meet their formal and informal learning needs (see **Table 2**, **Figure 3**, and **Figure 5**). Consistent with prior findings (Demmans Epp 2010; Demouy and Kukulska-Hulme 2010), many of the participating migrants would only use the audio functions of mobile tools when in private locations even though, like other language learners (Demouy *et al.* 2016), they highly valued the listening practice that these devices afforded. Participating migrants also selected “resources based on their needs and the technology available to them” (Palalas 2011, p. 84) as well as their current social context. This combination of factors led many of the participating learners to focus on developing their vocabulary knowledge, possibly because it was an easy to identify gap that they knew how to fill. They were additionally aware that having sufficient vocabulary knowledge would enable communication.

This study shows that mobile tools can be used to support the communication of ELLs and confirms findings that these learners will use support tools to prompt or otherwise enable their communication (de Jong *et al.* 2008; Palalas 2015). Participating migrants used mobile tools that included dedicated language-learning applications and dictionary or translator applications to overcome communication barriers with others in their environment. Their use of MALL tools supports Palalas’ (2011, p. 83) claim that MALL “engenders situated practice and flexible learning across space, time, and contexts”. While participant reports show that MALL supported their ability to learn across spaces and contexts, many of their reported gaps demonstrate contexts in which migrants were struggling to learn or communicate even with the support of mobile tools. The registers with which migrants were familiar defined these contexts. Each participant seemed to face different challenges. Some struggled with more professional settings (e.g., the dentist’s office or contracts). Others were able to understand registers that are more academic but could not understand the less formal

register that was employed by their fellow students during everyday conversation.

Beyond needing support understanding different registers, these and other ELLs wanted opportunities to communicate (Liu 2009), practice understanding and producing language (Palalas 2011), or monitor the quality of their pronunciation (Demouy and Kukulska-Hulme 2010). However, not all migrants were able to use mobile tools to support these activities. Like other ELL migrants (Palalas 2015), Dima chose not to respond when his communication goals exceeded his abilities. He instead chose to depend on another person rather than rely on technologies to support his communication. This choice, participant preferences for using mobile tools for media consumption (Palalas 2011; Demmans Epp 2016c; Demouy *et al.* 2016), and prior findings (Kukulska-Hulme *et al.* 2015) indicate that ELLs need additional scaffolding with respect to how they can use mobile technologies to support their communication. Learners may also need specific guidance to help them overcome the perception that has been created by their prior interactions with commercial applications: this perception is that of an expectation to consume provided content rather than interact with or create content. The actions of participants who employed mobile tools to support their communication suggests that overcoming this perceptual barrier should be possible. Migrants should be able to move from being content consumers to content creators by repurposing existing tools, but this process may require encouragement or scaffolding.

The potential for this shift in attitudes is illustrated through Arash’s creation and sharing of content, the editing of the experimental MALL tool’s content by other migrants, and the logging of novel language by Ju. These actions are argued to support language learning (Swain 1995; Kukulska-Hulme and Bull 2009). Moreover, they evidence a shift away from the content consumption that current media encourages, and they confirm a desire for more interactive and socio-collaborative approaches to learning, as discussed by Palalas (2011; 2015). However, the narrow reporting of participant engagement in these types of socio-collaborative and self-regulated learning approaches indicates a need for support tools that encourage these behaviours and develop learners’ meta-cognitive and self-regulatory skills. Mobile tools that integrate features, such as open learner models and learning dashboards, can provide feedback to learners or allow them to track their progress (Bull and Kay 2010; Tsourounis and Demmans Epp 2016), thus addressing this need. Similarly, tools that allow migrants to access socio-emotional support (Bravo *et al.* 2014) or that encourage continued effort (Tsourounis and Demmans Epp 2016) are needed.

Some of the comprehension gaps that learners identified could be addressed through current technologies without adjusting migrant preferences for media consumption. Among these challenges are those related to the use of different registers, speaker accent, the rate of speech, and variability in the English variety used by speakers. Learners are already using freely available audio-visual resources, such as YouTube (Palalas 2011),

TED talks (Palalas 2011), and Coursera (Bárcena and Martín-Monje 2015), to develop their listening skills. These tools allow learners to seek out videos with speakers who use other varieties of English, different registers, or different accents. These tools additionally allow learners to adjust the playback speed. All of these features can be combined to help ELLs and migrants adjust to the types of language they will encounter in their everyday lives. However, it appears that they need help finding the appropriate resources (Palalas 2010). They also need to be made aware of how these features can be used to support their learning.

Limitations

This small study was conducted within a specific cultural context. As a result, the findings may not apply more generally or outside of the studied context. That said, participants had a broad range of abilities and backgrounds that represent the complex nature of migration within the Canadian context. Additional study and consideration of the above findings in light of similar studies should provide a broader understanding of how migrants initiate MALL tool use to support their language-learning and communication needs when their new home requires them to interact through a language with which they are not entirely familiar.

Conclusion

This study highlights how ELL migrants choose to employ the many tools that support narrow learning tasks (e.g., vocabulary knowledge, grammar, or listening). The data indicate that several of these migrants' everyday needs are not being met by programs whether these programs are social, educational, or technological in nature. This finding is consistent with work that was conducted with specific migrant populations in Canadian (Palalas 2011; 2015) and other cultural (Pearson 2011a; 2011b) contexts. It expands the applicability of these findings to a broader group of migrants. The study develops our understanding of ELL and migrant use of MALL tools when that use is learner-initiated rather than teacher-initiated.

ELL experiences indicate that too few tools scaffold the larger learning challenges faced by these migrants. These challenges include ELLs' ability to communicate; understand multiple registers, accents, and varieties of English; monitor their own learning; and obtain socio-emotional support. These gaps, which were identified either directly or indirectly by participating migrants, suggest a need for technologies that better support languaging or that enable socio-collaborative learning and support. English language learners' desire for additional communication opportunities and socio-collaborative support indicates a need for new or improved socio-technical solutions that enable recent migrants to support one another. These solutions should avoid encouraging comparison since recent migrants can experience exceptionally high levels of negative affect (Demmans Epp 2016a). As Dima's assigning communication responsibilities to his wife demonstrates, some of them are already ceding control and beginning to give up.

Perhaps, most importantly, tools need to start addressing larger learning needs. It is no longer enough for tools to target specific knowledge components. It is time for tools to move towards developing an independent learner who can identify what she or he needs to learn and then appropriately target his or her activities towards developing those skills. This means that migrants need to learn how to monitor and regulate their learning so they can take full advantage of the opportunities that are presented to them.

Acknowledgements

The author held a Walter C. Sumer Memorial Fellowship and a W. Garfield Weston Fellowship while conducting this work.

Competing Interests

The author has no competing interests to declare.

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How to cite this article: Demmans Epp, C 2017 Migrants and Mobile Technology Use: Gaps in the Support Provided by Current Tools. *Journal of Interactive Media in Education*, 2017(1): 2, pp.1–13, DOI: <https://doi.org/10.5334/jime.432>

Submitted: 20 August 2016 **Accepted:** 18 January 2017 **Published:** 05 April 2017

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